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diabase is 14 per cent. denser than melted diabase, and 10 per cent. denser than the glass produced by quick freezing of the liquid. He gives no data, nor do Rücker and Roberts-Austen, who have also experimented on the thermodynamic properties of melted basalt, give any data, as to the latent heat evolved in the consolidation of liquid lava into rock of basaltic quality. Guessing it as three times the latent heat of fusion of the diabase pitch-stone, I estimate a million cubic centimeters of liquid frozen per square centimeter per centimeter per three years. This would diminish the depth of the liquid at the rate of a million centimeters per three years, or 40 kilometers in twelve years.

§ 25. Let us now consider in what manner this diminution of depth of the lava ocean must have proceeded, by the freezing of portions of it; all having been at temperatures very little below the assumed  $1420^{\circ}$  melting temperature of the bottom, when the depth was 40 kilometers. The loss of heat from the white-hot surface (temperatures from  $1420^{\circ}$  to perhaps  $1380^{\circ}$  in different parts) at our assumed rate of two (gramme-water Centigrade) thermal units per sq. cm. per sec. produces very rapid cooling of the liquid within a few centimeters of the surface (thermal capacity .36 per gramme, according to Barus) and in consequence great downward rushes of this cooled liquid, and upwards of hot liquid, spreading out horizontally in all directions when it reaches the surface. When the sinking liquid gets within perhaps 20 or 10 or 5 kilometers of the bottom, its temperature\* becomes the freezing-point as raised by the increased pressure; or, perhaps more correctly stated, a temperature at which some of its ingre-

dients crystallized out of it. Hence, beginning a few kilometers above the bottom, we have a snow shower of solidified lava or of crystalline flakes, or prisms, or granules of feldspar, mica, hornblende, quartz, and other ingredients: each little crystal gaining mass and falling somewhat faster than the descending liquid around it till it reaches the bottom. This process goes on until, by the heaping of granules and crystals on the bottom, our lava ocean becomes silted up to the surface.

(To be concluded.)

*THE POSTHUM\* PHANTOM: A STUDY IN THE SPONTANEOUS ACTIVITY OF SHADOWS.*

At the April meeting of the Astral Camera Club of Alcalde the veteran sciosophist and former President of the Stanislaus Geological Society, Mr. Abner Dean of Angels, described his investigations of shadow-life, as exemplified in the strange case of Peter Schlemihl.

It seems that this gentleman, late a resident of Kunersdorf, in Germany, on one occasion was approached by a gray-haired stranger who offered to purchase his shadow. Schlemihl named a price, which was instantly accepted. Thereupon the stranger knelt upon the grass, rolled up the shadow, folded it neatly and thrust it into his knapsack, at once disappearing down the road between two hedges of roses, leaving Schlemihl himself absolutely shadowless.

At first the poor man took the deprivation lightly. But, as time went on, the singularity of his position wore upon him, the whispered words and doubtful glances of his friends began to distress him, and he fell into a condition of marked physical discomfort. He set out in search of

\* The temperature of the sinking liquid rock rises in virtue of the increasing pressure: but much less than does the freezing point of the liquid or of some of its ingredients. (See Kelvin, *Math. and Phys. Papers*, Vol. III., pp. 69, 70.)

\* 'Posthumous Humanity:' A study of Phantoms, by Adolph D'Assier, Member of the Bordeaux Academy of Sciences. Translated and Annotated by Henry S. Olcott; London, George Redway, York St., Covent Garden.

the shadow and, after many adventures, he overtook the man to whom he had sold it. But neither promises nor blows availed anything. The stranger turned a deaf ear to the former, and the latter only served to tear or bruise the shadow which the stranger used in self-defence. When at last Schlemihl died it was observed he left no wraith to rustle through the old graveyard at Kunersdorf. According to Mr. Chamisso, a friend of Schlemihl, who has recorded the facts above noted, "An event had taken the place of an action as has happened not infrequently in the world's history." That he was unable to nullify this event was supposed to be the cause of the failure of his efforts at self-realization. But this ethereal epigram does not explain why the loss of his shadow made him physically uncomfortable. For the cause of this we must search in the fluidic conditions by which he was surrounded.

Mr. Dean has, therefore, devoted special attention to these details, to make clear the nature of the shadow itself and of the being who made way with it.

Certain writers have too hastily assumed that this being was the Devil. This is obviously not the case, for this fabled creation, the 'Faded fancy of an elder world,' 'the fluidic phantom of effete orthodoxy,' as Mr. Dean styled it, has no objective existence. The fact that the stranger was dressed in black which seemed red by transmitted light, and that he exhaled a faint sulphurous aroma, would seem to bear out this supposition. But these details were more likely results of pure fancy, perhaps heightened by the presence of a highly concentrated fluidic aura.

The real nature of the being is shown by the erudite researches of Dr. Adolph D'Assier on the 'fauna of the shades,' as set forth in his remarkable volume on 'Posthumous Humanity.' The stranger was, doubtless, a lycanthropic posthom, or

shadow-devouring phantom, who, being unable to suck the blood of Schlemihl himself, carried away his shadow to strengthen his own fast waning identity. There are many records, especially among the peasants of Little Russia, of phantoms who satisfy their hunger in this uncanny way. The word lycanthropic (wolf-manly) was drawn from this common habit with the wehr-wolf, the phantasmal double of the common gray wolf. The same tendencies are found in posthoms of wolf-like men to which the generic term 'lycanthropic' is also applied. It may be noted that now the wolf is practically extinct in the forests of Germany; its posthom, the wehr-wolf, no longer appears and its familiar call of 'willi-wa-wu: wito-hu' is no longer heard in the German shades.

The name posthom (*post*—after; *homo*—man) was some years since offered by Mr. Dean as a general designation for those phantasmal doubles which D'Assier calls by the awkward and inadequate name of fluidic forms or fluidic phantoms. It was at first supposed that these creations were exclusively human and natural sequences of physical death. The error of this opinion is now made evident, but the convenient name, as more definite than phantom and more generic than wraith, may still be retained with this broader definition.

The origin of the posthom is thus explained by Mr. Dean: It is well known that all animals and plants are built up of cells or chambers, each cell containing the magnetic life jelly or protoplasm. It is also well established that these cells are not completely filled by this substance. Moreover, it is known that even protoplasm itself is not a true liquid, but a mass of network, like a skein of tangled yarn. In this cell and its skein of protoplasm the minute atoms of the odic forces of the universe penetrate. In so doing, by their entanglement and permeation, they built up within the cells a form corresponding in all re-

spects to that of the living creature as a whole, but in reality its double or negative, being solid only when the first is empty, and being empty when the first is solid.

The well-known astral body of man is a species of posthum. But astrality is not confined to man. It has been shown by Mr. William Q. Judge that the 'body of the jelly-fish is almost pure astral substance.' It is, in fact, a posthum of a marine organism which has become saturated with water, which fills all the interstices in its anatomy, thus giving it an independent and self-perpetuating existence. For the distinguished scientist of the Society of Bordeaux has shown that the posthum phantom of man is "the exact image of the person of whom it is the complement. Internally it represents the mould of all the organs which constitute the framework of the human body. We see it, in short, move, speak, take nourishment, perform, in a word, all the great functions of animal life. The extreme tenuity of these constituent molecules, which represent the last term of organic matter, allow it to pass through the walls and partitions of apartments. Nevertheless, as it is united with the body, from which it emanates by an invisible vascular plexus, it can, at will, draw to itself, by a sort of aspiration, the greater part of the living forces which animate the latter. One sees, then, by a singular inversion, life withdrawn from the body, which then exhibits a cadaverous rigidity and transfers itself entirely to the phantom, which acquires consistency, sometimes even to the point of struggling with persons before whom it materializes. It is but exceptionally that it shows itself in connection with a living person." But as soon as death has snapped the bonds (or vascular plexus) that attach it to our organism it definitely separates itself from the human body and constitutes the 'posthumous phantom' or posthum.

The fact of the occasional separation of the posthum during life is now perfectly authenticated. The case of Schlemihl comes under this head, as also the remarkable experience related by Mr. H. C. Andersen, of Copenhagen. A Danish country gentleman, of good family, it is alleged, lost his shadow at one time. He took a humorous view of the accident at first and consoled himself with the reflection that the world set too much store on shadows anyhow. But as time went on his philosophy failed. He noted that his own strength oozed away, and later that his clothing was becoming brittle and unable to support the slightest strain. It, too, had lost its shadow. His friends brought him word of strange pranks which his double performed in the society of the neighborhood, although at the same time he was confined to his room and finally to his bed. Apparently the posthum phantom felt a strange delight in bringing its master into ridicule. Finally it boldly usurped his place in social functions, ruling with a high hand and giving him an opportunity to be heard in his own defense. At last, in violent indignation, by a supreme effort of the will, the gentleman recalled the phantom, to the endless mystification of his friends. With the return of the posthum to his own cellular substance his physical and mental vigor returned and his new suit of clothes showed no lack of the ordinary shadow.

It will be noticed that in this case the phantom man was clothed in phantom clothing. This was similarly formed, being made up of the tenuous molecules which filled the cloth cells of the original garments. As it is notorious that posthums are clothed in materials similar to those worn by the person from whom they are derived, this deserves a moment's explanation.

Dr. D'Assier has conclusively shown that even inanimate bodies have their doubles, or posthums, as well as men and beasts.

This was at first doubted by that most critical of scientists, Mr. Henry S. Olcott, of Madras. He was, however, convinced of its correctness by the well-authenticated fact that inanimate bodies, as rocks and tea-cups, equally with animate bodies, are able to cast shadows. From the shadows of tea-cups philosophical generalizations of great value have been obtained in India and Thibet. The only body known to man which has no fluidic double, or shadow, is the sun. Its phantom is, perhaps, the whole visible universe, and it is the undoubted center of that fluidic force which is expulsive of all shadows. The shadow of an object is not as most people suppose, merely the absence of sunshine. If that were all it would be much less substantial in its nature than is now the case and would have no definite boundaries. The shadow is the phantasmal double. All material bodies have interspaces among their atoms corresponding to the cells in living organisms. Indeed, it is well known that molecules of matter nowhere touch one another, nor do they come anywhere near touching. If we could conceive the physical molecules of a rock as inhabited worlds a being with a telescope on one of them would gaze at his neighbor atom as our astronomers gaze forth on the mighty sun of Sirius. It is also well known that molecules do not really exist at all, but that each is really an eddy or storm center, and thus a center of attraction in the fluidic atmosphere of astral substances, in which all inhabited worlds are bathed. But omitting these considerations, which belong to ultimate science, or sciosophy, there is no doubt that the shadow of a man or a rock is itself an objective reality. It is a posthum driven out from its original station by the expellatory force of the sun. "The huge conical shadow of the earth which reaches beyond the moon and is called night" is not merely the absence of light. It is the hour of posthum

phantoms when all nature is saturated in fluidic forces. It is natural, then, that at night phantasms of all degrees should be at large, and that in this period and under its conditions all successful studies in the natural history of the shades have been accomplished.

During life the carnate body exerts a strong attraction for its posthum, so that the shadow is seldom seen far away from its host. Toward evening, however, it wanders more widely, and at last it may be apparently wholly detached. Whether this is really ever the case under normal conditions is not yet certainly known. This question will be the subject of further investigations by the members of the club at Alcalde.

Mr. James M. Barrie, of Edinburgh, in a volume bearing the curious title of 'Sentimental Tommy,' tells us that once in his youth he turned a corner in running so suddenly that he thereby 'dislocated his shadow.' It is easy to see that this might occur, though probably infrequently.

It is certain that at death the host ceases to exert any particular hold over its phantasm. The shadow wanders freely and at will. It is soon disconcerted because the stars begin to devour its substance, and it is but rarely that means can be found to resist their malign influence. For this reason all phantoms of the dead are disintegrated and reduced to primæval vapor within a space of ten to twenty days after their disassociation. This fear of dissolution is the cause of the violent excitement often shown by phantoms. From the same cause arises their proneness to linger about the haunts of the host in life or about his place of burial.

Certain classes of posthum phantoms have been known to suck the blood of the living, and thus to maintain a precarious existence for a number of days or weeks. These are known as vampires, and their existence

may usually be recognized by the roseate appearance of the body from which they are derived. It is said that the reduction of this body to ashes by fire will destroy the vampire posthum. At least Mr. Dean is convinced, from the experiences of several peasants in Lithuania, that this is correct. In all events, it is reasonable to suppose that the heat of a funeral pyre would attract the disintegrating posthum, and, once drawn into the current of hot air, it could in no way save itself.

"The most common yearning of the posthumous being," says Dr. D'Assier, "is to bid the last farewell to those who are used to it." But experiments prove that it is equally accessible to ideas of vengeance, while the wraiths of those who are unhappy in their affections are somewhat extremely perverse and demonstrative, being 'not always satisfied to signify resentment by noisy but harmless manifestations.'

While a vast array of cases are cited in support of the theory that posthoms delight in sympathy and in vengeance, one must be very cautious in receiving such evidence. We must not read our own emotions into the vagrant actions of the poor disconsolate shadows. The impending dissolution of posthum stares it, as it were, every moment in the face, and it may follow friend or enemy in the sole hope of somehow drawing substance, either blood or shadow, in order to continue its existence. They cannot last long at the best, nor is it right that they should do so, for if their status were indefinitely prolonged, as some have maintained, the world would long ago have become solidly full of phantoms, and for the amount of fluidic ether necessary for their production we should be obliged to draw on some other universe.

Dr. D'Assier very wisely observes (p. 176, *Posthumous Humanity*): "The perennial survival of shades would long ago have rendered this planet uninhabitable to us.

The dead would occupy the place of the living, for the accumulation of spectres of the different tribes of the terrestrial fauna heaped at the surface of the globe since the first geological epochs would render the air irrespirable. We could not move, save in a dense atmosphere of ghosts. Now, chemical analysis has never shown in the air the presence of either of the immediate principles which enter into the constitution of a fluidic phantasmal form elaborated in an animal economy. For our part we bitterly regret that these venerable shades have disappeared."

The evidence, on the other hand, is, however, worth consideration, as is shown by the following experiments of the famous Allan Kardec. One day his fancy led him to evoke the posthum of Tartuffe.

"Tartuffe did not wait to be dragged out by the ears, but speedily showed himself in all his classical peculiarities! It was veritably the personage created by Molière, with his soft and hypocritical speech, his wheedling ways, his air of sugar-coated piety. When, after close examination, he was satisfied as to the phantom's identity he was transported with pleasure and said to it:

"By the way, how is it that you are here, seeing that you never had any real existence?"

"That is true," answered the spectre in a most contrite tone, 'I am the spirit of an actor who used to play the part of Tartuffe.' Tartuffe, being unable to show himself for a very good reason, sends an actor in his place."

Kardec again tells of a nest of little birds in a garden. The nest having disappeared, the gentleman became uneasy as to the fate of his little pets. Being a person of enormous animal magnetism and, therefore, an adept in the calling and training of posthoms he went through the usual ceremony of calling the phantom of the mother bird, who was seeking caterpillars in a neighboring

tree. The shadow of the bird immediately came to him and replied to the anxious questioner: "Be quite easy. My young ones are safe and sound. The house-cat knocked down the nest in jumping on the garden wall. You will find them in the grass at the foot of the wall." The gentleman hurried to the garden and found the little nestlings full of life at the spot indicated.

As both these stories are perfectly authenticated, we must consider them in the light of our phantom knowledge. As the birds themselves were living at the time, the projection of their shadow offers nothing incongruous, especially if it took place in the dusk of the evening, a detail which Mr. Kardec omits, but which we may readily supply. The natural anxiety of the mother bird would, as it were, lend the shadow wings, and her intensity of feeling would produce the effect of conversation. It is not likely that the bird actually spoke, for the incident took place in France, and no bird, not even the most refined parrot, has yet spoken French. There are other ways of conveying information than word of mouth, and an enlightened master knows how to make use of them. In the case of *Tartuffe* the phantom may have been real and virtually immortal. It belongs to another class than the shadow phantoms. The creation of a great poet's brain has an objective existence which may be far more permanent than the shadow of an ordinary actor. No doubt, the image formed in the brain having the gigantic aura of that of Molière could so embody itself in astral precipitates as to secure a life which might endure for centuries.

It need surprise no one to meet the phantasm of *Tartuffe* in real existence. Surely the shades of Hamlet and Portia and Othello have a definite place among the objective phenomena of Earth just as surely as their names have a fixed place in our

literature. Doubtless, at times this posthumous Shylock crosses the Rialto bridge, and the phantom of melancholy Jacques may be found flitting disconsolate through the forest of Arden. The sad plight of the posthumous King of Denmark, for example, has not failed to touch the hearts of all lovers of literature. Indeed, the strength of the genius of Shakespeare is such that the ancient king and his famous son and namesake have as firm a reality as that of the mediocre flesh and blood people which swarm in modern society. We may notice in passing that the speech of the phantom king indicates that he was plunged in the depths of sorrow. "The impression left on the mind," says D'Assier, "by the lamentations and the vain replies of the shades who succeed in making themselves heard is always a sentiment of profound sadness." He compares the feelings of such a personage to those of a European transported suddenly and nakedly into the wilds of Australia, with just enough of his reason left "to have the feeling of his impotence and eternal isolation."

Dr. Eliphas Levi, in his famous 'Dogma and Ritual,' traces the career of shades still more closely, emphasizing especially the existence of two mortal bodies after death, the one heavy and confined on the earth, the other flitting about in the mediate atmosphere. "When a man has lived well," says Dr. Levi, the astral corpse or posthumous "evaporates like a fine incense in mounting to higher regions. If the subject lived in crime this phantom retained as prisoner seeks the object of its passions and tries still to cling to life. But the stars breathe it and drink it ('les astres l'aspirent et le boivent'). It feels its intelligence grow feeble. Its memory is slowly lost; all its being must dissolve."

Those scientific men (and there are many) who find all attributes of the universe derived from the four gases, hydrogen

(blue or spirit), phosphorus (red or hope), carbon (black or fear) and nitrogen (green or life), derive from their postulates a different view of the nature of shades and phantoms. In the famous treatise on the 'Discovery of Misconceptions' this theory is set forth in an engaging manner.

"The ethnological divisions of the human race," says the author, "proceed directly from excessive vibrations of these four gases. The white skin of the Caucasian marks an approach to the harmonious relation of the four gases. This relation has been gradually produced by salt or the hidden blue hydrogen imbedded in salt. The skin and characteristics of the Ethiopian mark the superior force of carbon and phosphorus; those of the Mongolian, of sulphur, or a combination of hydrogen and phosphorus; those of the Indian, of nitrogen and hydrogen. Through the same study of the natural relation existing between the four gases, all natural forms, from a microbe to a whale or elephant, may be understood."

In such fashion the materialists have endeavored to set aside all problems of the posthum phantom, by resolving them with the hopes and fears of man into gas, controlled by colored forces of chemical relation.

On the other hand, immaterialists claim that of all forms of fluidic forces personal magnetism is the most potent. It is shown by Mr. William Q. Judge that the astral light of the imagination can form images of all imaginable things, and these, by the magnetism of the will, can be clothed in matter through precipitation. These objects will readily fade away unless fixed by some permanent mordant. "The distinct image of every line of every letter or picture," says Mr. Judge, "is formed in the mind, and then out of the air is drawn the pigment to fall within the limits laid down by the brain, 'the exhaustless generator of face and form.'"

Mr. Dean found himself unwilling to differ from so high an authority as Mr. Judge, who,

more than any other recent investigator, has sounded the limitless ocean of sciosophy. The facts, however, remain. To the materialist, on the one hand, he would say: "There are more things in heaven and earth than are dreamed of in our philosophy, surely far more than hydrogen, carbon, nitrogen and phosphorus." To the immaterialist he would emphasize this fact: There is not a posthum phantom extant which has not its double in material things. When the body decays the *posthum* disintegrates. When the tree falls its shadow falls with it, and there is no adequate evidence that a true shadow can be made by the precipitation of fine forms of matter on the image laid down in the brain.

A vision thus formed in the brain could surely have no digestive apparatus, yet no phantom is better attested than the donkey of St. Croix, who for several days after his actual death and burial was seen by several gentlemen wandering about in its old pasture, cropping the fluidic shadows of the growing oats. Careful observations showed that the actual oats suffered no injury. It is not likely that the donkey would feed on oats unless it retained a stomach in which oats could be placed. Whether actually digested or not would not affect the argument.

The images formed in the brain have no anatomy; and though, no doubt, actual matter is often precipitated upon them, in accordance with Mr. Judge's observations, the result is rather a picture than a posthum, as only the side of the posthum image nearest the brain is actually developed and materialized. If Mr. Kardec had given close attention to the shadow of Tartuffe he would have found it a flat bas-relief or spiritual cameo instead of a figure in perspective.

That posthums can accomplish at times great material results is beyond question. Under the head of the "geometry of phantoms," Dr. D'Assier makes the important



observation that "invisible projectiles hurled by posthoms produce mechanical effects as great as if they were of great bulk." This he shows is due to the fact that "all bodies have their phantasmal doubles, which the shade can detach and grasp. The garments it carries, the objects it holds in its hand, are phantasmal images borrowed from its former wardrobe or its former utensils. It is presumable that the same holds as to invisible projectiles; in lieu of stones they fling their duplicates."

It may seem surprising that the shadow of a stone could harm any one or produce any sort of a physical commotion. But here we are to remember that it is not the weight of a thrown object which tells, but its momentum. Its momentum is its weight multiplied by its velocity. "Its live force at the moment of fall," says D'Assier, "is equal to half the bulk multiplied by the square of its velocity." It is well known that the velocity of a living posthom may be scarcely less than that of a flash of light. The instantaneous apparition and disappearance of phantoms shows this. The true posthom never deliquesces, as the old-fashioned ghost is said to do, but in reality it moves away with much celerity. It is plain, then, that however light a shadow may be, it is a terrible weapon when hurled with almost infinite velocity by a disembodied posthom. Its concussion might be heard as a great shock, if flung with sufficient force. It is related that in the castle of Schreckheim, in Franconia, a posthom once entered the pantry on a shelf of which was the ancestral china of the noble house. Soon a mighty crash of breaking dishes arose. On entering the room the noble lord of the castle found everything in place. The excited posthom had merely flung down the phantasms of the different pieces of china, but with a force so mighty that the noise reverberated to the outer walls of the castle. It may be thought that the posthom

in question was that of a servant girl who had been deeply reprovèd for breaking a favorite teacup, and who, dying soon after, had this method of expressing her vanishing feelings. But, curiously enough, the servant girl whose posthom caused the disturbance recovered from her illness and lived to break many more pieces of rare china, in this and other castles to which she was sent by the intelligence office in Nuremberg. From this we may conclude that her illness was due to the temporary breaking of the vascular plexus which holds the posthom to the body, and that when her shadow came back from its rounds her health was promptly restored.

It is, in fact, certain that very many forms of disease, known as anæmia, neurasthenia, echolalia and the like are due to the temporary absence of the posthom shadow. It can be sought for by direct means, and it will usually be found engaging in absurd and freakish actions. An effective method of cure is to strengthen the degree of personal magnetism and to bring the shadow back by a strong effort of the will. Mental healing, mind-cure suggestion, astral magnetism and the like are forms of this process. Contact with certain relics has produced an odic shock which has served the same useful purpose.

In concluding this most interesting discourse, soon to be printed in full in the annals of the Club of Alcalde, the distinguished sage of Angels asserts that we shall do well to heed the wise words of Dr. Adolphe D'Assier: "Let us not be deceived by appearances and let us be on our guard that in exploring the domain of the shades we may not take a shade of reasoning for reasoning itself." For Logic as well as Magic has also its Phantasmal Double, and when truth dips wearily under oblique suns the two are apt to range very far apart.

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